

Remarks/Arguments:

Claims 1-6 are pending and stand rejected. In this response, Applicants are amending claim 1 and claim 6, cancelling claim 4 without prejudice, and adding claims 7-10. Accordingly, claims 1-3 and 5-10 are presented for reconsideration. No new matter has been added.

Applicants' invention is drawn to a hermetic compressor having grooves provided at an upper side and a lower side of the outer circumference of a piston. The outer shape of the grooves communicates with a space in the hermetic container at least when the piston is in a bottom dead center.

Rejections under 35 U.S.C. §102

Claims 1 and 2 are rejected under 35 U.S.C. §102(b) as being anticipated by Japanese Patent Publication No. 2003-065236 (hereinafter "Katayama"). Applicants respectfully submit, however, that the claims are patentable over the art of record for at least the reasons set forth below.

Applicants' invention as recited by claim 1, includes features which are neither disclosed nor suggested by the art of record, namely:

. . . the outer shape of the grooves is a semicircular shape extending toward a skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape, and

the groove enclosed by the first outer shape communicates at least with the space in the hermetic container when the piston is in the bottom dead center.

These features are found in Applicants' specification, for example, at page 11, line 7 to page 12, line 10 and in Figs. 2 and 3. No new matter has been added.

According to claim 1, the present invention relates to a hermetic compressor as described in the attached Amendment. The hermetic compressor has grooves in a semicircular shape placed at the outer circumference of the piston. This semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the

top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape. Further, the groove enclosed by the first outer shape communicates at least with the space in the hermetic container when the piston is in the bottom dead center.

The Office Action relies upon Katayama as disclosing:

. . . grooves (23e) are provided at an upper side and a lower side of the outer circumference of the piston, and of an outer shape of the grooves, the outer shape of the grooves communicating with a space in the hermetic container at least when the piston is in a bottom dead center is a shape not forming a parallel line to an axial center of the piston when the grooves are developed in a plane . . .

Katayama discloses that a notch 7c is formed on the cylinder 13 so that the oil supply grooves 23e formed around the piston 23 can be exposed to the space in the hermetic container when the piston 23 is in the bottom dead center. The oil supply groove 23e of Katayama is an annular groove formed around the outer circumference of the piston. Katayama fails to disclose, however, a groove with a semicircular shape placed on the outer circumference of the piston.

In contrast, Applicants' invention as recited in claim 1 requires that the outer shape of the grooves is a semicircular shape extending toward a skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape, and the groove enclosed by the first outer shape communicates at least with the space in the hermetic container when the piston is in the bottom dead center.

It is because Applicants include the features of the outer shape of the grooves being a semicircular shape extending toward a skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape, and the groove enclosed by the first outer shape communicates at least with the space in the hermetic container when the piston is in the bottom dead center that the following advantages are achieved. This allows sufficient oil supply to the groove to improve

lubricity as described in the specification page 11, line 7-page 12, line 10, and the refrigeration capacity of the hermetic compressor is increased. Further, these features prevent local wear as described in the specification page 12, lines 11-15.

Katayama fails to achieve these advantages because Katayama does not have the outer shape of the grooves being a semicircular shape extending toward a skirt side of the piston, and the semicircular shape including a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape, and the groove being enclosed by the first outer shape communicating at least with the space in the hermetic container when the piston is in the bottom dead center.

Accordingly, Katayama fails to disclose or suggest every feature of claim 1. Applicants respectfully request therefore the withdrawal of the 35 U.S.C. §102 rejection and request allowance of claim 1. Claim 2 depends from claim 1, and, thus, is likewise not subject to rejection for at least the reasons set forth above with respect to claim 1.

Rejections under 35 U.S.C. §103

Claim 3 is rejected under 35 U.S.C. §103(a) as being unpatentable over Katayama. Claims 4 and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Katayama in view of U.S. Patent No. 5,839,351 (hereinafter "Nakada"). Claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Katayama in view of U.S. Patent No. 5,092,747 (hereinafter "Irino"). The rejection of claim 4 is obviated by its cancellation. Applicants respectfully submit, however, that the remaining claims are patentable over the art of record for at least the reasons set forth below.

Claim 3 depends on claim 1 and, thus, is likewise not subject to rejection for at least the reasons set forth above with respect to claim 1.

Regarding claim 5, Irino is cited in the Office Action as disclosing the use of hydrocarbon refrigerants in refrigerant compressors. Irino fails to make up for the deficiencies, however, of Katayama as set forth above with respect to claim 1. Applicants respectfully request therefore that the rejection of claim 5, which depends on claim 1, be withdrawn and the claim allowed.

Applicants' invention, as recited by independent claim 6, includes features which are neither disclosed nor suggested by the art of record, namely:

. . . the grooves include a first groove portion extending toward a skirt side of the piston, and a second groove portion extending toward a top side of the piston, having a semicircular shape . . .

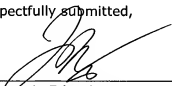
Regarding claim 6, Nakada discloses that the oil grooves 5 are formed in the positions higher than the piston pin 22, and this allows a larger area to take on the weight. Nakada also discloses that covering the oil groove 5 with the outer member 7 produces a cushioning effect on the hydraulic pressure. The groove 5 of Nakada has a linear shape (a line shape or an I-shape) as shown in Figs. 1 and 3. The groove 5 of Nakada is a C-shaped groove. Further, the groove 5 of Nakada is covered with the outer member 7, such that the groove does not communicate with a sealed space. In addition, the groove 5 of Nakada receives oil from the oil passage 6.

As described above, Katayama and Nakada fail to disclose or suggest a groove having a semicircular shape as described in independent claim 6. Accordingly, Applicants respectfully request the withdrawal of the 35 U.S.C. §103 rejection and allowance of claim 6.

Newly added claims 7-10 depend on either claim 1 or 6 and, thus, are allowable for at least the reasons set for above with respect to claims 1 and 6.

In view of the amendments and arguments set forth above, Applicants submit that the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



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